Complete Summary

GUIDELINE TITLE

Exercise prescription for older adults with osteoarthritis pain: consensus practice recommendations.

BIBLIOGRAPHIC SOURCE(S)

Exercise prescription for older adults with osteoarthritis pain: consensus practice recommendations. A supplement to the AGS Clinical Practice Guidelines on the management of chronic pain in older adults. J Am Geriatr Soc 2001 Jun;49(6):808-23. [191 references] PubMed

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Osteoarthritis

GUIDELINE CATEGORY

Management
Treatment

CLINICAL SPECIALTY

Family Practice
Geriatrics
Internal Medicine
Physical Medicine and Rehabilitation

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Nurses
Patients
Physical Therapists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To provide an evidenced-based review that explains why a physically active life style benefits older adults with osteoarthritis
- To provide practical strategies and exercise guidelines for this expanding patient population

TARGET POPULATION

Older adults (aged 65 years or older) with osteoarthritis who are seen in the primary care setting

INTERVENTIONS AND PRACTICES CONSIDERED

1. Flexibility (range-of-motion) exercise, such as static stretching exercise
2. Strength training exercise (i.e. isometric and isotonic exercise)
3. Aerobic exercise

MAJOR OUTCOMES CONSIDERED

- Joint flexibility
- Muscle strength
- Endurance
- Osteoarthritis pain
- Aerobic fitness
- Other measures, including functional status, energy metabolism, insulin action, bone density, body composition, lipoprotein lipid profile, and blood pressure

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

A literature search involving a full-text computer search of Index Medicus and MEDLINE using the terms osteoarthritis, exercise, and aging was first conducted. An extensive manual search using the bibliographies of the publications located through the computer search was also undertaken.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Committee)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

A study was included in this review if the publication made an implicit or explicit claim regarding osteoarthritis or research designed to evaluate the effects of exercise on physiologic or functional parameters in older adults.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

These practice recommendations are derived from the existing literature and by consensus among a panel of experts from many disciplines: geriatrics, internal medicine, orthopedics, physical therapy and rehabilitation, exercise physiology, nursing, and pharmacy.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Members of the multidisciplinary panel reviewed successive drafts of the report summarizing their findings, and the final draft was submitted for review and comment by experts routinely involved in the care of older adults. The American Geriatric Society (AGS) Clinical Practice Committee and the AGS Board of Directors reviewed and approved the practice recommendations.

The following organizations with special interest and expertise in the management of osteoarthritis and exercise in older persons provided expert review of an earlier version of the guidelines: American Academy of Family Physicians, American Academy of Orthopaedic Surgeons, American Academy of Physical Medicine and Rehabilitation, American Nurses Association, and the American Physical Therapy Association.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Refer to the guideline document for information on exercise assessment, including patient screening and the need for graded exercise testing, as well as basic exercise principles and prescription components.

The key exercise recommendations for patients with osteoarthritis follow.

Flexibility (Range-of-Motion) Exercises

Static Stretching Exercise: General Recommendations

- Exercise daily when pain and stiffness are minimal (i.e., prior to bedtime).
- Exercises can be preceded by a warm shower or by application of superficial moist heat.
- Relax before beginning stretching exercises.
- Perform movements slowly and extend the range of motion that is both comfortable and produces a slight subjective sensation of resistance. Breathe during each stretch.
- Hold this terminal stretch position for 10 to 30 seconds before slowly returning the joint or muscle group to the resting length.
- Modify the stretching exercises to avoid pain or when the joint is inflamed (decrease the extent of joint range of motion or the duration of holding the static position).

Strength Training

Isometric Strength Training Recommendations

- Exercises: Include exercises that involve the major muscle groups in Table 6 (shown below).
- Intensity: Introductory, isometric contractions should be performed at low intensity. To establish the exercise intensity, ask the patient to maximally contract the muscle targeted for strengthening. (O'Grady, Fletcher, & Ortiz, 2000; Kraemer & Newton, 2000) This is the patient's maximal voluntary contraction and initial training intensity should begin at approximately 30% of

this maximal effort. As tolerated by the patient, the intensity should gradually increase to 75% of the maximal voluntary contraction.

- Volume: The contraction should be held for no longer than 6 seconds. Initially, one contraction per muscle group should be performed, and the number of repetitions should be gradually increased to eight to 10, as tolerated by the patient.
- The patient should be instructed to breathe during each contraction. Twenty seconds of rest between contractions is suggested. (Slemenda et al., 1997; Singh, Clements, & Fiatarone, 1997; Schwartz et al., 1991.)
- Frequency: Exercises should be performed twice daily during acute inflammatory periods. The number of these exercises should be gradually increased to five to 10 times per day, as tolerated by the patient.
- Progression: Initially, contractions should be performed at muscle lengths tolerable to the patient. As pain and inflammation decrease, contractions should be performed at different muscle lengths and joint angles. (Seals et al., 1984) As strength develops, resistance may be added (i.e., contractions against an immovable weight).
- Precaution: Contraction >10 seconds can increase blood pressure. (Spina et al., 1996)

Table 6. Key Muscle Groups Targeted for Stretching and Strengthening Exercises

Head, neck:

- Extensors, flexors

Shoulder:

- Forward flexion, extension, abduction, adduction
- External and internal rotators
- Scapular retractors and depressors

Elbow

- Extensors, flexors

Forearm, wrist

- Pronators, supinators
- Wrist extension, flexors

Hand

- Finger flexor, extensors
- Thumb adductor, abductors

Trunk, low back

- Forward flexion, extension, side bending, rotation

Hips

- Forward flexion, extension, abduction, adduction
- External rotation, internal rotation

Knees

- Extensors, flexors

Ankle, foot

- Dorsiflexors, plantar flexors
- Inverters, everter
- Toe flexors, extensors

Osteoarthritis Isotonic Exercise Recommendations

Because older osteoarthritis sufferers with a sedentary lifestyle are likely to have diminished physiologic reserve these exercises should not proceed to muscle fatigue.

- Exercises: Resistance training should involve eight to 10 exercises involving the major muscle groups.
- Intensity: Resistance should begin at 40% of the patient's one repetition maximum (1RM). Maximum resistance should be 80% of 1RM.
- Volume: The beginner should complete one set of four to six repetitions. Exercisers should avoid muscle fatigue.
- Frequency: The frequency of training should be a maximum of 2 days per week.
- Progression: The progression of resistance training intensity and volume should be gradual to allow time for adaptation. A 5% to 10% increase per week in the amount of resistance used for training seems appropriate.

Aerobic Training

Aerobic Exercise Recommendations

- Exercises: Activity selection depends on several factors: the patient's current disease activity, joint stability, and resources and interests. The patient should choose a variety of exercise options, to prevent overuse of specific joints and to avoid exercise boredom. Examples of aerobic exercise are bicycling, swimming, low-impact aerobics (i.e., walking, dance, or Tai Chi), or exercising on equipment such as treadmills or rowing machines. Other more utilitarian activities, such as walking the dog, mowing the lawn, raking leaves, or playing golf, are also considered aerobic exercise and should be encouraged. Aquatic exercise is a good choice for osteoarthritis patients; pool exercises performed in warm water (86 degrees Fahrenheit) provide analgesia for painful muscles and joints. Moreover, the buoyancy of the aquatic environment reduces joint loading, enhances pain-free motion, and provides resistance for strengthening muscle groups around arthritic joints. In addition, pool therapy is commonly a group activity that may help reduce a

patient's depression and feelings of isolation. High-impact aerobic training involves rapid application of loads across joint structures and should be avoided, as recent research suggests that the magnitude of joint loading may not be as important in producing pain or damage as the rate of joint loading. (O'Grady, Fletcher, & Orriz, 2000)

- Intensity: Several valid tools are useful for selecting appropriate exercise intensity, the gold-standard being maximal aerobic power (VO_{2MAX}). However, establishing a patient's VO_{2MAX} is costly and sometimes difficult to obtain. Practical tools that can be helpful in determining appropriate exercise intensity include maximal heart rate (HR_{MAX}: 220 minus age in years), rating of perceived exertion (RPE: a 15-point ordinal scale, 6 to 20), or the "talk test" (whether an exerciser can converse comfortably during the activity without getting short of breath). (Ware & Sherbourne, 1992; Wessel & Quinney, 1984) Exercise intensity is considered low to moderate when 1) HR_{MAX} is between 50% and 75% (i.e. an 80 yr old's HR_{MAX} would be 220 minus 80 or 140 with 50-75% being 70-105), 2) an RPE between 10 and 13, and 3) a positive "talk test." The aerobic exercise intensity should then range between HR_{MAX} 50% to 60%, RPE 10 and 12, or positive on the "talk test." For many osteoarthritis patients, especially those taking medications that control heart rate, the "talk test" or RPE is the simplest method for determining exercise intensity.
- Volume: The recommended volume for the beginner is a minimum of 20-30 minutes per day. Some older, sedentary adults are unable to complete 20-30 minutes of continuous aerobic activity at low to moderate intensity. An acceptable alternative is four to five shorter exercise bouts (each, a minimum of 5 minutes) performed at slightly higher intensities (i.e., 55% to 60% HR_{MAX}) throughout the day. (Wolf et al., 1996; Worrell, Smith, & Winegardner, 1994) Accumulating between 60 and 90 minutes of moderate level physical activity over the course of a week has been included in recent recommendations from the American College of Sports Medicine (ACSM). As fitness improves, exercise bouts can be lengthened gradually to 20 to 30 minutes of continuous aerobic activity.
- Frequency: The initial frequency of training should be at least 3 days but no more than 4 days per week. Frequency of five times per week is not recommended because of increased risk for injury.
- Progression: The progression of aerobic training intensity and volume should be gradual to allow time for adaptation (i.e., 2 to 3 months). Following this initial phase of aerobic training, a 2.5% increase per week in the intensity or volume may be compatible with the reduced physiologic reserve associated with older arthritis patients.
- Precautions: Musculoskeletal injuries are preventable. More often than not, injuries can be avoided if the patient gradually works up to the desired activity level and avoids excessive amounts of activity.

Refer to the original guideline document for a discussion on the role of pharmacologic therapy in the management of osteoarthritis.

CLINICAL ALGORITHM(S)

An algorithm is provided for the management of osteoarthritis in the older patient.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

These practice recommendations are derived from the existing literature and by consensus among a panel of experts from many disciplines: geriatrics, internal medicine, orthopedics, physical therapy and rehabilitation, exercise physiology, nursing, and pharmacy.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Randomized, controlled trials clearly show that regular moderate-level exercise does not exacerbate osteoarthritis pain or accelerate the pathological process of osteoarthritis. Furthermore, these studies strongly indicate that increasing the level of physical activity in osteoarthritis patients reduces pain and morbidity.

Potential benefits of specific types of exercise:

- Static stretching exercises: Static stretching exercises may improve joint range of motion.
- Resistance training: Studies have shown that resistance training reverses many age-related physiologic changes and can improve function.
    - Isometric strength training: Isometric strength training may improve muscle strength, static endurance, and may prepare the joints for more dynamic movements.
    - Isotonic strength training: Isotonic strength training has been shown to produce positive effects on energy metabolism, insulin action, bone density, and functional status in healthy older adults.
- Aerobic exercise: Numerous physiologic benefits may occur, including improved maximal aerobic capacity (measurement of aerobic fitness), insulin action, body composition, and plasma lipoprotein lipid profiles. In addition, regular aerobic exercise reduces blood pressure.

POTENTIAL HARMS

Serious cardiovascular events can occur with physical exertion, although these usually occur during high-intensity activities. This risk should be considered in light of the fact that regular physical activity of moderate intensity lowers the risk of mortality from cardiovascular disease and can be safely implemented in patients with a low risk for such events.

CONTRAINDICATIONS

CONTRAINDICATIONS

Absolute contraindications to exercise by the osteoarthritis patient include:

- uncontrolled arrhythmias
- third degree heart block
- recent electrocardiographic changes
- unstable angina
- acute myocardial infarction
- acute congestive heart failure

Relative contraindications to exercise by the osteoarthritis patient include:

- cardiomyopathy
- valvular heart disease
- poorly controlled blood pressure
- uncontrolled metabolic disease

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Exercise programs should be individualized to address the specific needs of the patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Jun

GUIDELINE DEVELOPER(S)

American Geriatrics Society - Medical Specialty Society

SOURCE(S) OF FUNDING

Funding was provided as an unrestricted educational grant from McNeil Consumer Health Care, Fort Washington, Pennsylvania.

GUIDELINE COMMITTEE

American Geriatrics Society Panel on Exercise and Osteoarthritis

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Author: Michael O´Grady, MD

Panel Members: Gail Davis, EdD, RN; Carlos H. Rojas-Fernandez, PharmD; Bruce Ferrell, MD; Roger Levy, MD; David C. Neiman, DrPH; Mark A. Young, MD, FACP

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American Geriatrics Society Web site.

Print copies: Available from the American Geriatrics Society, 350 Fifth Avenue, Suite 801, New York, NY 10118.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 28, 2002.

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